

WHAT IS CLAIMED IS:

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1. A projection exposure apparatus,
comprising:

an illumination optical system for
5 illuminating a pattern of a reticle with laser light
from a continuous emission excimer laser;

a projection optical system for projecting
the illuminated pattern onto a substrate; and

adjusting means for adjusting an optical
10 characteristic of said projection optical system in
accordance with a change in wavelength of the laser
light.

2. An apparatus according to Claim 1, wherein
15 said adjusting means includes correcting means for
correcting a change in optical characteristic of said
projection optical system due to a change in wavelength
of the laser light.

3. An apparatus according to Claim 1, wherein
20 said adjusting means includes detecting means for
detecting the wavelength of the laser light.

4. An apparatus according to Claim 1, wherein
25 said adjusting means operates to adjust the optical
characteristic of said projection optical system by
(i) moving at least one of a reticle, a wafer and one

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or more lenses of said projection optical system in an optical axis direction of said projection optical system, (ii) tilting at least one of the reticle, the wafer and one or more lenses of said projection optical system, (iii) decentering one or more lenses of said projection optical system, or (iv) changing a pressure of a closed space between lenses.

5 An apparatus according to Claim 1, further comprising driving means for scanningly moving the reticle and the substrate, wherein said illumination optical system illuminates the reticle with slit-like light of a rectangular or arcuate shape.

10 6. An apparatus according to Claim 1, wherein said apparatus is adapted for formation of an image of a linewidth 0.13 micron, and wherein a half bandwidth of a wavelength spectrum of the laser light is not greater than 0.1 pm.

15 7. An apparatus according to Claim 1, wherein said apparatus is adapted for formation of an image of a linewidth 0.09 micron, and wherein a half bandwidth of a wavelength spectrum of the laser light is not greater than 0.08 pm.

20 8. An apparatus according to Claim 1, wherein

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said excimer laser is an ArF excimer laser, and wherein the glass material is SiO₂.

9. An apparatus according to Claim 1, wherein
5 said excimer laser is an F₂ excimer laser, and wherein the glass material is CaF₂, BaF₂ or MgF₂.

10. An apparatus according to Claim 8, wherein
10 said lens system includes lens elements of a number of at least ten, and wherein first one or first two of said lens elements in an order from the substrate side are made of CaF₂, BaF₂ or MgF₂.

11. A device manufacturing method, comprising
15 the steps of:

exposing a substrate with a pattern by use
of a projection exposure apparatus as recited in Claim 1; and

developing the exposed substrate.